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Filing Date: March 31, 2004
Title: APPARATUS AND METHOD FOR GENERATING TRANSFORMS

IN THE CLAIMS

Please amend the claims as follows:

1. (Currently Amended) An apparatus comprising:

a primary information storage unit having a primary storage capacity;

a secondary information storage unit to receive information stored in the primary information storage unit and the secondary information storage unit having a secondary storage capacity, the secondary storage capacity being less than the primary storage capacity; and

an information processing unit coupled to the primary information storage unit and to the secondary information storage unit, the information processing unit to receive information from the secondary information storage unit, to process the information to form a transform of the information, and to store the transform in the primary information storage unit, wherein the processing includes,

forming a transform of an N point signal where N is an integer by a first method if the logarithm of N to the base four is an integer and N is less than or equal to a particular value,

forming the transform of the N point signal by a second method if the logarithm of N to the base four is an integer and N is greater than the particular value,

forming the transform of the N point signal by a third method if the logarithm of N to the base four is not an integer, but the logarithm of N to the base two is an integer.

2. (Original) The apparatus of claim 1, wherein the information processing unit includes a data selector unit coupled to the secondary information storage unit, a register unit, and a computational unit.

3. (Original) The apparatus of claim 2, wherein the computational unit includes a butterfly unit.

4. (Original) The apparatus of claim 3, wherein the butterfly is configurable as either a radix-2 butterfly unit or a radix-4 butterfly unit.

5. (Original) The apparatus of claim 3, wherein the butterfly is configurable as a radix-2 butterfly unit and a radix-4 butterfly unit.

6. (Original) The apparatus of claim 1, wherein the transform of the information comprises a Fourier transform of the information.

7. (Original) The apparatus of claim 2, wherein the secondary information storage unit is to provide information blocks having a fixed length to the information processing unit.

8. (Original) The apparatus of claim 2, wherein the secondary information storage unit is to provide a first stream of information blocks having a first fixed length and a second stream of information blocks having a second fixed length, the first fixed length being equal to, less than, or greater than the second fixed length.

9. (Currently Amended) A ~~signal bearing media~~ computer memory encoded with machine-readable instructions, wherein the instructions when read and executed comprise:

partitioning data in a primary information storage unit into one or more fixed length blocks;

storing at least one of the one or more fixed length blocks in a secondary information storage unit;

processing the at least one of the one or more fixed length blocks using a butterfly computation to form processed information, wherein the processing includes,

forming a transform of an N point signal where N is an integer by a first method if the logarithm of N to the base four is an integer and N is less than or equal to a particular value,

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forming the transform of the N point signal by a second method if the
logarithm of N to the base four is an integer and N is greater than the particular
value,

forming the transform of the N point signal by a third method if the
logarithm of N to the base four is not an integer, but the logarithm of N to the
base two is an integer; and

storing the processed information in the primary information storage unit.

10. (Currently Amended) The ~~signal bearing media~~ computer memory of claim 9, wherein
processing the at least one of the one or more fixed length blocks using the butterfly computation
to form the processed information comprises performing a radix-2 butterfly computation.

11. (Currently Amended) The ~~signal bearing media~~ computer memory of claim 9, wherein
processing the at least one of the one or more fixed length blocks using the butterfly computation
to form the processed information comprises performing a radix-4 butterfly computation.

12. (Currently Amended) The ~~signal bearing media~~ computer memory of claim 9, wherein
processing the at least one of the one or more fixed length blocks using the butterfly computation
to form the processed information comprises performing a radix-2 butterfly computation and
performing a radix-4 butterfly computation.

13. (Original) A method comprising:

forming a transform of an N point signal where N is an integer by a first method if the
logarithm of N to the base four is an integer and N is less than or equal to a particular value;

forming the transform of the N point signal by a second method if the logarithm of N to
the base four is an integer and N is greater than the particular value; and

forming the transform of the N point signal by a third method if the logarithm of N to the
base four is not an integer, but the logarithm of N to the base two is an integer.

14. (Original) The method of claim 13, wherein forming the transform of the N point signal where N is an integer by the first method if the logarithm of N to the base four is an integer and N is less than or equal to the particular value comprises:

        calculating a fast Fourier transform of the N point signal by processing the N point signal using one or more radix-4 butterfly computations performed using one processing unit.

15. (Original) The method of claim 13, wherein forming the transform of the N point signal by a second method if the logarithm of N to the base four is an integer and N is greater than the particular value comprises:

        processing the N point signal in stages;

        partitioning the stages into one or more groups; and

        processing the one or more groups, after interleaving, by performing a butterfly computation on information contained in each of the one or more groups.

16. (Original) The method of claim 13, wherein forming the transform of the N point signal by a third method if the logarithm of N to the base four is not an integer, but the logarithm of N to the base two is an integer comprises:

        processing a first stage of the N point signal using a first radix; and

        processing remaining stages using a second radix.

17. (Original) The method of claim 16, wherein processing the first stage of the N point signal using the first radix comprises calculating a fast Fourier transform of the N point signal by processing the N point signal using one or more radix-2 butterfly computations performed using one processing unit.

18. (Original) The method of claim 16, wherein processing remaining stages using the second radix comprises using the first method or the second method.

19. (Currently Amended) A system comprising:

        a communication unit including an omnidirectional antenna to receive a signal;

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a primary information storage unit having a primary storage capacity, the primary information storage unit included in the communication unit;

a secondary information storage unit to receive a signal stored in the primary information storage unit and the secondary information storage unit having a secondary storage capacity, the secondary storage capacity being less than the primary storage capacity; and

an information processing unit coupled to the primary information storage unit and to the secondary information storage unit, the information processing unit to receive the signal from the secondary information storage unit, to process the signal to form a Fourier transform of the signal, and to store the Fourier transform of the signal in the primary information storage unit, wherein the processing includes,

forming a transform of an N point signal where N is an integer by a first method if the logarithm of N to the base four is an integer and N is less than or equal to a particular value,

forming the transform of the N point signal by a second method if the logarithm of N to the base four is an integer and N is greater than the particular value,

forming the transform of the N point signal by a third method if the logarithm of N to the base four is not an integer, but the logarithm of N to the base two is an integer.

20. (Original) The system of claim 19, wherein the communication unit comprises a cellular telephone.

21. (Original) The system of claim 19, wherein the primary information storage unit comprises a semiconductor memory.

22. (Original) The system of claim 19, wherein the secondary information storage unit comprises a magnetic memory.

23. (Original) The system of claim 19, wherein the information processing unit comprises one or more computational units to perform a butterfly computation.

24. (Original) The system of claim 19, further comprising a computer system coupled to the communication unit.